

Amendments to the Specification:

Please amend the Disclosure of the Invention section at page 5, line 3 to page 10, line 13 as follows:

Disclosure of Invention

According to a first invention, an image processing system comprises: a photographing apparatus; and a processing apparatus. The photographing apparatus comprises: a plurality of light-emitting devices for illuminating a subject, the plurality of light-emitting devices respectively emit light having the independent and different characteristics of spectroscopic distributions at least in a visible-light area; an image pick-up optical system which forms a subject image illuminated by the light-emitting devices; an image pick-up device unit which picks up the subject image formed by the image pick-up optical system and outputs an image signal; and a control unit which controls an operation for capturing a plurality of subject spectroscopic images by selectively lighting on the plurality of light-emitting devices in accordance with the characteristics of the spectroscopic distributions and by varying the selection of the plurality of light-emitting devices with the synchronization of the light-on operation and the operation for picking up the image by the image pick-up device by a plurality of times. The

processing apparatus comprises: a calculating unit which performs desired image calculation from the image signal.

According to the second invention, in the first invention, the control unit sets a group comprising a plurality of devices comprising at least one light emitting device from among the plurality of light emitting devices in accordance with the characteristics of the spectroscopic distributions, determines the light on sequence of the plurality of devices in the set group, lights on the light emitting devices in the devices in accordance with the light on sequence for selective light on operation, and controls the plurality of spectroscopic images.

According to the third invention, in the second invention, the control unit sets a plurality of types of the groups and controls the operation for using the set groups necessary for application.

According to the fourth invention, in the third invention, the control unit sets a group of the light emitting groups comprising the light emitting devices of blue in the visible light area, the light emitting devices of red in the visible light area, and the light emitting devices of green in the visible light area, among from the plurality of light emitting devices, sequentially lights on the light emitting devices of the group every image pick up frame, and controls the operation for

~~picking up a three primary color moving image by the image pick up device unit.~~

~~According to the fifth invention, in the third invention, the photographing apparatus further comprises: a photographing operating unit which inputs at least an instruction for starting a spectroscopic image photographing operation. The control unit controls the operation for capturing the plurality of subject spectroscopic images in accordance with the input of the instruction for starting the spectroscopic image photographing operation from the photographing operating unit.~~

~~According to the sixth invention, in the fifth invention, the photographing operating unit comprises a pressing button switch, and the control unit controls the operation for changing the group upon pressing the button switch.~~

~~According to the seventh invention, in the sixth invention, the control unit controls light on timings of the devices of the changed group, upon pressing the button switch.~~

~~According to the eighth invention, in the first invention, the control unit controls the operation for starting the image pick-up operation by the image pick-up device unit after starting the light-on operation of the light emitting device and for ending it before lighting off the light emitting device.~~

~~According to the ninth invention, in the first invention, the image pick-up device unit comprises: a spectroscopic unit~~

which performs the spectroscopy on incident light to make it into light with a plurality of wavelengths; and a plurality of image pick-up devices which pick up the light with the plurality of wavelengths subjected to the spectroscopy by the spectroscopic unit.

According to the tenth invention, in the first invention, the image pick-up device unit comprises a color image pick-up device having a color filter array.

According to the eleventh invention, in the first invention, the photographing apparatus further comprises a spectrum sensor which senses the characteristics of the spectroscopic distributions of the light-emitting devices.

According to the twelfth invention, in the first invention, the photographing apparatus further comprises a spectrum sensor which senses the characteristic of the spectroscopic distribution of ambient light.

According to the thirteenth invention, in the first invention, the photographing apparatus further comprises an abutting portion which is abutted to the subject at one end thereof.

According to the fourteenth invention, in the thirteenth invention, the abutting portion comprises a flexible material with cylindrical shape.

According to the fifteenth invention, in the thirteenth invention, the abutting portion comprises a material which rejects or reduces the influence from ambient light.

According to the sixteenth invention, in the thirteenth invention, the abutting portion is detachable to a casing of the photographing apparatus.

According to the seventeenth invention, in the first invention, the processing apparatus further comprises an image memory unit which stores the subject spectroscopic image photographed by the photographing apparatus, and the calculating unit calculates a desired image based on the image signal stored in the image memory unit.

According to the eighteenth invention, in the seventeenth invention, the calculating unit calculates a signal for displaying the subject image which is color reproduced at the high fidelity level based on the subject spectroscopic image stored in the image memory unit.

According to the nineteenth invention, in the eighteenth invention, the processing apparatus calculates profile information necessary for calculating the signal for displaying the subject image which is color reproduced at the high fidelity level based on the data captured by the photographing apparatus.

According to the twentieth invention, in the seventeenth invention, the calculating unit determines or analyzes the

~~subject based on the subject spectroscopic image stored in the image memory unit and outputs the determining or analyzing result.~~

~~According to the twenty-first invention, in the first invention, the image pick-up device unit changes a frame rate for the image pick-up operation.~~

~~According to the twenty-second invention, in the first invention, the photographing apparatus further comprises a photographing operating unit for inputting at least an instruction for starting the spectroscopic image photographing operation, and the control unit controls the operation for capturing the plurality of subject spectroscopic images in accordance with the input of the instruction for starting the operation for photographing the spectroscopic image from the photographing operating unit.~~

SUMMARY OF THE INVENTION

According to a first aspect of the invention, an image processing system includes a photographing apparatus, and a processing apparatus.

In addition, according to a first aspect of the invention, the photographing apparatus includes: a plurality of light-emitting devices for emitting illumination light having characteristics of spectroscopic distributions varied in at least a visible light range; an image pick-up optical system which

forms a subject image of a subject illuminated by the light-emitting devices; an image pick-up device unit which picks-up the subject image formed by the image pick-up optical system and outputs an image signal; and a control unit which controls the photographing apparatus to capture images in one of a spectroscopic image capturing mode and a moving image capturing mode, selectively.

In the spectroscopic image capturing mode, the control unit controls at least a plurality of the plurality of light-emitting devices, which are selected according to the characteristics of the spectroscopic distributions of the light emitting devices, to sequentially light-on, and the control unit controls the image pick-up device unit to capture sequential spectroscopic still images of the subject simultaneously with the sequential lighting-on of the light-emitting devices. In the moving image capture mode, the control unit one of: (i) controls a specific primary color of the light-emitting devices to light-on, and controls the image pick-up device unit to capture a moving image while the specific primary color of the light-emitting devices are lighted-on, and (ii) controls a plurality of groups of the light-emitting devices to sequentially light-on group by group, each of the groups including at least one of the light-emitting devices and the characteristics of the spectral distributions of each of the groups being different, and controls the image pick-

up device unit to capture a moving image while the groups of the light-emitting devices are sequentially lighted-on.

Moreover, according to the first aspect of the invention, the processing apparatus comprises a calculating unit which performs an image calculation based on an output of the image pick-up device.

According to a second aspect of the invention, in the first aspect, the control unit sets a plurality of types of groupings of the groups of the light-emitting devices, and in the moving image capture mode the control unit selects a type of grouping to be lighted-on in accordance with an application of the photographing apparatus.

According to a third aspect of the invention, in the second aspect: in the moving image capturing mode, the control unit controls the plurality of groups of the light-emitting devices to sequentially light-on group by group; the plurality of groups comprise a group of the light-emitting elements which emit blue light in the visible range, a group of the light-emitting elements which emit red light in the visible light range, and a group of the light-emitting elements which emit green light in the visible light range; and in the moving image capturing mode, the control unit controls the image pick-up device unit to pick-up a frame of the moving image each time one of the groups is lighted-on, so as to capture a three-primary-color moving image.

According to a fourth aspect of the invention, in the third aspect, the photographing apparatus further includes a photographing operating unit which inputs at least an instruction for starting a spectroscopic image photographing operation to capture the spectroscopic still images of the subject in the spectroscopic image capturing mode.

According to a fifth aspect of the invention, in the fourth aspect, a plurality of groupings of the groups of the light-emitting devices are set, the photographing operating unit includes a pressing button switch, and the control unit changes a grouping to be lighted-on upon pressing of the button switch.

According to a sixth aspect of the invention, in the fifth aspect, the control unit controls light-on timings of the light-emitting devices of the groups of the changed grouping, upon pressing of the button switch.

According to a seventh aspect of the invention, in the fourth aspect, the photographing operating unit includes a pressing button switch, and the control unit switches between the spectroscopic image capturing mode and the moving image capturing mode in accordance with pressing of the button switch.

According to an eighth aspect of the invention, in the first aspect, the image pick-up device unit includes a color image pick-up device having a color filter array.

According to a ninth aspect of the invention, in the eight aspect, at least one of the plurality of light-emitting devices has a characteristic of spectroscopic distribution extending between different bands of the color filter array.

According to a tenth aspect of the invention, in the first aspect, the photographing apparatus further includes: a spectrum sensor which senses the characteristics of the spectroscopic distributions of the light-emitting devices.

According to an eleventh aspect of the invention, in the first aspect, the photographing apparatus further includes a spectrum sensor which senses a characteristic of spectroscopic distribution of ambient light.

According to a twelfth aspect of the invention, in the first aspect, the photographing apparatus further includes a display section for displaying an image based on the image signal outputted from the image pick-up device unit.

According to a thirteenth aspect of the invention, in the first aspect, the photographing apparatus further includes an abutting portion which is abutted to the subject at one end of the photographing apparatus.

According to a fourteenth aspect of the invention, in the thirteenth aspect, the abutting portion includes a flexible material with a cylindrical shape.

According to a fifteenth aspect of the invention, in the thirteenth aspect, the abutting portion includes a material which prevents or reduces influence of ambient light.

According to a sixteenth aspect of the invention, in the thirteenth aspect, the abutting portion is detachably coupled to a casing of the photographing apparatus.

According to a seventeenth aspect of the invention, in the first aspect, the processing apparatus further includes an image memory unit which stores the spectroscopic still images photographed by the photographing apparatus in the spectroscopic image capturing mode. In addition, the calculating unit includes a color-reproduction calculating unit for calculating image data for displaying an image of the subject which is color-reproduced at a high fidelity level based on the spectroscopic still images stored in the image memory unit.

According to an eighteenth aspect of the invention, in the seventeenth aspect, the color-reproduction calculating unit generates image data of XYZ tristimulus values, and the calculating unit generates an input profile for generating the image data of the XYZ tristimulus values using at least one of illumination light spectrum data and characteristic data of the image pick-up device unit.

According to a nineteenth aspect of the invention, in the seventeenth aspect, the calculating unit determines or analyzes

the subject based on at least one of the spectroscopic still images stored in the image memory unit, and the calculating unit outputs a result of the determining or analyzing.